Evaluating the Benefits of Reducing Canine Carbohydrate Intake:

A More "Natural" Diet?

Evidence Review
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***Abstract*— It has been theorized that a zero-carbohydrate diet is a healthier feeding strategy for domestic dogs than a traditional high-carbohydrate diet because a zero-carbohydrate diet more closely resembles the diet consumed by the genetic ancestors of modern-day dogs. This white paper evaluates the strength of the two separate theses that together make up this theory: (1) that the domestic dog's ancestors ate a zero-carbohydrate diet and (2) that mimicking the diet of one's genetic ancestors is a sensible strategy for achieving good health. We conclude that the genetic ancestors of domestic dogs consumed essentially zero carbohydrate for at least 99.83% of their evolution as a canine species and that mimicking such a diet may prove a reasonably strategy for helping dogs avoid the diseases of civilization that currently plague Western pet populations.**

EVIDENCE REVIEW

The grey wolf is the domestic dog's closest genetic cousin. Most genomic research suggests that genetic divergence between the two species occurred only 14,000 years ago, although some have suggested that divergence may date to as early as 100,000 BC. In any event, it is clear that dogs and wolves were one and the same species for at least 99.83% of their genetic evolution. Even today, the two species share more than 98% of their mitochondrial DNA. In fact, they are so genetically similar that interbreeding is relatively common, despite the extreme rarity of the practice across species more generally.

It is beyond dispute that grey wolves do not consume carbohydrates in any meaningful quantities. As apex predators equipped with all the typical physical traits of carnivory, their diets are, and have always been, composed entirely of meat. Primary prey sources vary depending upon geographic location, but the scholarly literature makes clear that wolves get essentially all of their nutrition from meat sources. (The only exception to this rule that we found documented in the literature is that animals living near and amongst human populations in Eurasia have been known to forage in trash heaps, a practice that may reasonably be assumed to yield some plant-based foods. Other than that, they exist—and *thrive*—on all-meat diets.)

Indeed, one of the primary physiological differences between dogs and wolves is the extent to which the two species produce pancreatic amylase, an enzyme responsible for catalyzing the digestion of starches. Numerous recent genome sequencing studies have demonstrated that dogs possess far more copies than do wolves of a gene responsible for pancreatic amylase production. Given the importance of amylase to starch digestion, it is doubtful that wolves could even exist on a starch-rich diet for any prolonged period of time.

It is clear, then, that dogs did not begin consuming starches in any meaningful quantities until (at the very earliest) the last 0.16% of their evolution as a canine species. Whether this fact suggests that a starch-free diet is in any way healthier for dogs than a diet rich in carbohydrates is, however, another matter.

It is beyond the scope of this white paper to consider the extent to which evidence suggests the existence of any specific health benefits associated with reducing canine carbohydrate intake. What is undeniable, however, is that the overwhelming majority of the domestic dog's genetic evolution occurred in a nutritional environment in which carbohydrates played no role whatsoever. And, as, Eaton and Konner wrote in their seminal 1985 *New England Journal of Medicine* paper, the most basic tenets of evolutionary biology suggest that such a diet should therefore serve as a "reference standard" for modern diets "and a model for defense against certain 'diseases of civilization.'"

Unfortunately, chronic diseases of canine "civilization" are a major cause for concern among modern-day pets. Obesity, cancer, osteoarthritis, and (to a lesser extent) diabetes mellitus

are all rampant in modern pet populations. At the same time, they pose almost no threat whatsoever to wild canine species. Whether and how the high-carbohydrate diets typically fed to modern-day pets are in any way responsible for these disease epidemics is beyond the scope of this white paper, but the subject is addressed elsewhere in this series.

In short, it is clear that dogs only recently evolved the capacity to digest starches and, thus, to draw nutrition from carbohydrate-rich diets, a trait which surely would have been adaptive in an environment of nutritional scarcity. But this does not suggest that these animals can do so without at the same time increasing their risk of developing chronic diseases of civilization such as obesity, cancer, osteoarthritis, and diabetes mellitus. To the contrary, given the lengthy historical absence of carbohydrates from the diet of the domestic dog's ancestors, basic evolutionary biology suggests that pathophysiological links between carbohydrate consumption and these chronic diseases may well exist.

Overall Support For Primary Theses

(1) The domestic dog's genetic ancestors did not consume carbohydrates - 10/10 (unimpeachable evidentiary support and universal acceptance by leading scientific authorities).

(2) Reversion to a diet typical of one's genetic ancestors is likely to yield health benefits – 6/10 (persuasive conceptual framework that requires additional evidence to confirm any specific hypothesis).

References

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